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Application No. 10/573,301
Reply to Office Action of November 10, 2009

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Docket No.: 65140(70551)

REMARKS

In the Office Action dated November 10, 2009, claims 1-14 are pending, claims 6-13 are withdrawn from consideration and claims 1-5 and 14 are rejected. Reconsideration is requested for at least the reasons discussed hereinbelow.

The present invention, as set forth in claim 1, is directed to a manufacturing method of a liquid crystal display panel, comprising:

a sealant arranging step of arranging a sealant on a main surface of one of or each of two substrates to be bonded to each other;

a liquid crystal dropping step of dropping liquid crystal on one of said two substrates; and

a bonding step of bonding said two substrates to each other, wherein said method further includes:

to be performed prior to said sealant arranging step, a deaerating step of arranging in a pressure-reduced atmosphere at least a substrate on which said sealant is to be arranged out of said two substrates; and

to be performed prior to said bonding step, a releasing step of releasing said pressure-reduced atmosphere by an inert gas.

Claims 1-5 and 14 are rejected under 35 U.S.C. §103(a) over Horiuchi et al. (US 2005/0024580; "Horiuchi") in view of Uh et al. (US 6,892,437; "Uh") and Oshima et al. (US 5,725,032; "Oshima"). The Examiner admits at least that Horiuchi *fails* to disclose "a liquid dropping step of dropping liquid crystal on one of two substrates" and that "a releasing step is performed by an inert gas." Uh is cited to make up for the lack of disclosure of the liquid dropping step and Oshima is cited to make up for the lack of disclosure of the releasing step. The Examiner concludes that it would have been obvious to one having ordinary skill in the art to employ a method of dropping liquid crystal on one of two substances to minimize liquid crystal consumption, cost and waste, and to employ a releasing step using an inert gas.

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Applicant strongly disagrees that the presently claimed invention would have been obvious to one of ordinary skill in the art in view of any combination of Horiuchi, Uh and Oshima.

Horiuchi discloses a process for attaching a plastic substrate to an opposing TFT substrate when making a LCD device. After the two substrates are attached, the liquid crystal material is inserted between the attached substrates through an injection port under vacuum. Thus, Horiuchi fails to teach or suggest, at least, as claimed herein: (1) prior to said sealant arranging step, a deaerating step of arranging in a pressure-reduced atmosphere at least a substrate on which said sealant is to be arranged out of said two substrates, (2) a sealant arranging step of arranging a sealant on a main surface of one of or each of two substrates to be bonded to each other, (3) a liquid crystal dropping step of dropping liquid crystal on one of said two substrates, and (4) prior to said bonding step, a releasing step of releasing said pressure-reduced atmosphere by an inert gas. The bonding step necessarily comes after the liquid crystal dropping step.

Uh describes a liquid crystal dropping step in the Background of the Invention. There, Uh states that "the liquid crystal dropping method has problems" [col. 3, lines 62-63]. Uh discloses a method of fabricating LCDs that avoids unnecessary processing of NG ("no good") individual liquid crystal panels by using stored information about NG substrate panel areas and grinding cutting faces of only good individual liquid crystal panels in a continuous fabrication line. However, nevertheless, Uh discloses that the liquid crystal dispensing process, wherein liquid crystal is dropped onto each substrate panel area of the TFT substrate, is carried out as follows [col. 6, line 62 - col. 7, line 14]:

- i. removing dissolved air in the liquid crystal in the liquid crystal container by a vacuum;
- ii. assembling the liquid crystal container into a syringe on a head of a dispensing apparatus;
- iii. dropping liquid crystal dots having a uniform pitch on each unit TFT substrate area;
- iv. loading the CF substrate and the TFT substrate into a vacuum chamber and assembling into a composite liquid crystal panel, thereby spreading the liquid crystal over the panel substrate areas to form unit liquid crystal panel areas; and

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v. curing the seal material to form a liquid crystal panel having a plurality of unit liquid crystal panel areas.

Thus, Uh fails to teach or suggest at least the following steps:

to be performed prior to said sealant arranging step, a deaerating step of arranging in a pressure-reduced atmosphere at least a substrate on which said sealant is to be arranged out of said two substrates; and

to be performed prior to said bonding step, a releasing step of releasing said pressure-reduced atmosphere by an inert gas,

as set forth in present claim 1.

It is not seen how one of ordinary skill in the art combines the process of Horiuchi, which involves injecting liquid crystal between two bonded substrates, and the process of Uh, which drops liquid crystal dots on one substrate before the two substrates are bonded together.

In any event, neither Horiuchi nor Uh teach or suggest releasing the pressure-reduced atmosphere after placing liquid crystal on the substrate but prior to bonding the two substrates together to form the LCD cell.

Oshima *fails* to make up for the deficiencies of Horiuchi and Uh. Although Oshima discloses releasing a pressure-reduced atmosphere with an inert gas, Oshima *fails* to teach or suggest releasing the pressure-reduced atmosphere after placing liquid crystal on the substrate but prior to bonding the two substrates together to form the LCD cell. Indeed, Oshima also teaches filling the bonded substrates with liquid crystal under vacuum by releasing the pressure-reduced atmosphere.

Thus, none of the cited references, taken alone or all in combination, teach or suggest (1) prior to said sealant arranging step, a deaerating step of arranging in a pressure-reduced atmosphere at least a substrate on which said sealant is to be arranged out of said two substrates, (2) a sealant arranging step of arranging a sealant on a main surface of one of or each of two substrates to be

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bonded to each other, (3) a liquid crystal dropping step of dropping liquid crystal on one of said two substrates, and (4) prior to said bonding step, a releasing step of releasing said pressure-reduced atmosphere by an inert gas, as set forth in claim 1.

Claim 14 and the dependent claims are patentable for at least the reasons discussed above.

Thus, it is not seen how the presently claimed invention would have been obvious to one of ordinary skill in the art in view of any combination of Horiuchi, Uh and Oshima.

If for any reason a fee is required, a fee paid is inadequate or credit is owed for any excess fee paid, the Commissioner is hereby authorized and requested to charge Deposit Account No. 04-1105.

In view of the discussion above, Applicant respectfully submits that the pending application is in condition for allowance. An early reconsideration and notice of allowance are earnestly solicited.

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Dated:

Respectfully submitted,

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